

INTERNATIONAL JOURNAL OF ENERGY AND ENVIRONMENT

**Official Journal of the International Energy and
Environment Foundation**

ISSN 2076-2895 (Print) ISSN 2076-2909 (Online)

Volume 3, Issue 6, 2012

© 2012 International Energy and Environment Foundation. All rights reserved

Aims and Scope

The International Journal of Energy and Environment (IJEE) is the official journal of the International Energy and Environment Foundation providing an international forum for the fields of Energy and Environment. The journal aims to provide the most complete and reliable source of information on current developments in the field. The emphasis will be on publishing quality articles rapidly and making them freely available to researchers worldwide. The journal has a distinguished editorial board with extensive academic qualifications, ensuring that the journal will maintain high academic standards and has a broad international coverage. There are no page charges and all articles are indexed by the major indexing media therefore providing the maximum exposure to the articles. The scope of the journal includes the following:

Energy

- Fuel cells.
- Hydrogen energy.
- Solar energy conversion and photovoltaics.
- Wind energy.
- Hydro energy.
- Micro- and nano-energy systems and technologies.
- Biofuels and alternatives.
- Hybrid / integrated energy systems.
- Energy conversion, conservation and management.
- Energy efficient buildings.
- Energy storage.
- Energy and sustainable development.
- Advanced visualization techniques, virtual environments and prototyping.

Environment

- Energy and environmental impact.
- Assessment of risks from water, soil and air pollution; effective and viable remedies.
- Evaluation and management of environmental risk and safety.
- Environment and sustainable development.
- Environmental education and training.
- Analysis of contaminants.
- Contaminant source characterization, transport and deposition.
- Multi-media sampling / monitoring (air, soil, water, sediment).
- Quality assurance / control.
- Legislative issues and guidelines.
- Remediation.
- Climate change.

A note to authors

Submission of articles

Articles submitted to the Review should be original contributions and should not be under consideration for any other publication at the same time. The submitting author is responsible for obtaining agreement of all co-authors as well as any sponsors' required consent before submitting a paper. Responsibility for the content of a paper lays on the Authors and not on the Editors or the Publisher.

Formatting instructions can be found on author guidelines and must be strictly followed or else your paper will not be published. The paper template represents the basic guidelines and desired layout final manuscript of International Journal of Energy and Environment (IJEE). It's compulsory to use the template for the preparation of your paper. Full instructions can be found on the web site (<http://www.IJEE.IEEFoundation.org>).

Your Submitted Article

- Your article will be peer-reviewed and published very fast.
- Your biography will appear at the end of your article.
- Your article will be published free of charge. Free use of colour where this enhances the article.
- Your article can be read by potentially millions of readers, which is incomparable to publishing in a traditional subscription journal. All interested readers can read, download, and/or print your article at no cost!
- Your article will obtain more citations.
- Moreover, all articles are indexed by the major indexing media therefore providing the maximum exposure to the articles.

INTERNATIONAL JOURNAL OF ENERGY AND ENVIRONMENT

Official Journal of the International Energy & Environment Foundation

Journal homepage: www.IJEE.IEEFoundation.org



Editor-in-Chief

Maher A.R. Sadiq Al-Baghdadi

President of the International Energy and Environment Foundation (IEEF), Al-Najaf, P.O.Box. 39, Iraq.

Associate Editor

Hashim R. Abdol Hamid

Vice President of the International Energy and Environment Foundation (IEEF), Al-Najaf, P.O.Box. 39, Iraq.

Editorial Advisory Board

Tarek Abdel-Salam

Center of Sustainable Energy, Department of Engineering, East Carolina University, 207 Slay Bldg., Greenville, NC 27858-4353, USA.

Amitava Bandyopadhyay

Department of Chemical Engineering, University of Calcutta, 92, A.P.C.Road, Kolkata 700 009, India.

Angelo Basile

Institute on Membrane Technology of the Italian National Research Council, ITM-CNR, c/o University of Calabria, via P. Bucci, cubo 17/C, 87030 Rende (CS), Italy.

Wojciech Budzianowski

Wroclaw University of Technology, ul. Wybrzeze Wyspianskiego 27, 50-370 Wroclaw, Poland.

Eloy Velasco Gomez

ETS Ingenieros Industriales, Universidad de Valladolid, Paseo del Cauce, no 59, 47011 Valladolid, Spain.

Arunachala Nadar Kannan

Department of Engineering Technology, TECH 156, Arizona State University, 7001 E Williams Field Rd, Mesa, AZ 85212, U.S.A.

T. Lu

School of Mechanical and Electrical Engineering, Beisanhuan East Road, Chaoyang District, Beijing 100029, P.R.China.

A. Mani

Refrigeration and Air-conditioning Laboratory, Department of Mechanical Engineering, Indian Institute of Technology Madras, Chennai 36, Pincode 600 036, India.

Meng Ni

Department of Building and Real Estate, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong.

S-J Park

Department of Chemistry, Inha University, 253 Yonghyun-dong, Nam-gu 402-751, Korea (south).

Md. Mujibur Rahman

Department of Mechanical Engineering, College of Engineering, Universiti Tenaga Nasional, Km 7, Jalan Kajang-Puchong, 43009 Kajang, Selangor, Malaysia.

Julien Ramousse

Polytech'Savoie, Université de Savoie, Campus scientifique, Savoie Technolac, 73376 Le Bourget, du Lac, CEDEX, France.

Teemu Rasanen

Research Group of Environmental Informatics, Department of Environmental Sciences, University of Kuopio, FI-70211 Kuopio, Finland.

Marc A. Rosen

University of Ontario Institute of Technology, Faculty of Engineering and Applied Science, 2000 Simcoe Street North, Oshawa, Ontario, L1H 7K4, Canada.

David Michael Rowe

Cardiff School of Engineering, Queen's Buildings,
Newport Road Cardiff CF24 1XF, U.K.

Hisham M. Sabir

Kingston University, Faculty of Engineering, Friars
Avenue, London SW15 3DW, U.K.

Suresh Babu Sadineni

Center for Energy Research, Department of
Mechanical Engineering, Howard R. Hughes
College of Engineering, University of Nevada, Las
Vegas (UNLV) 89154-4027, U.S.A.

Bidyut Baran Saha

Department of Mechanical Engineering, National
University of Singapore, 9 Engineering Drive 1,
117576, Singapore.

Vicente Salas

Department of Electronic Technology, Universidad
Carlos III de Madrid, Avda. de la Universidad, 30,
28911 Leganes, Madrid, Spain.

Amin U. Sarkar

School of Business, Alabama A&M University,
Normal (Huntsville), AL 35762, U.S.A.

Joop Schoonman

Department DelftChemTech: Materials for Energy
Conversion and Storage, Delft University of
Technology, Julianalaan 136, 2628 BL Delft, The
Netherlands.

Tomonobu Senjyu

University of the Ryukyus, Faculty of Engineering, 1
Senbaru Nishihara-cho Nakagami Okinawa 903-
0213, Japan.

Jose Ramon Serrano

Universidad Politécnica de Valencia, CMT-Motores
Térmicos, Camino de Vera s/n, 46022 Valencia,
Spain.

Haroun A.K. Shahad

Department of Mechanical engineering, University
of Babylon, Babylon, Iraq.

Rajnish N. Sharma

Department of Mechanical Engineering, University
of Auckland, Private Bag 92019, Auckland 1142,
New Zealand.

S.A. Sherif

HVAC Laboratory, Department of Mechanical and
Aerospace Engineering, University of Florida, 232
MAE Bldg. B, Gainesville, Florida 32611-6300,
U.S.A.

Shailendra Kumar Shukla

Department of Mechanical Engineering, Institute of
Technology, B.H.U., Varanasi-221005, India.

Rayan Slim

Center for Energy and Processes, Ecole des Mines
de Paris, 104 Bobillot Street, 75013 Paris, France.

Laizhou Song

Department of Environmental and Chemical
Engineering, Yanshan University, Qinhuangdao
City, Hebei Province, P.R.China.

Adnan Sozen

Department of Mechanical Education, Gazi
University, Technical Education Faculty 06500
Teknikokullar, Ankara Turkey.

Roland Span

Lehrstuhl für Thermodynamik, Ruhr-University
Bochum, D-44780 Bochum, Germany.

Anurag K. Srivastava

Electrical and Computer Engineering, Mississippi
State University, 216 Simrall Hall, Hardy Road,
Mississippi State, MS 39762, U.S.A.

Rosetta Steeneveldt

Research Centre Trondheim, StatoilHydro, Arkitekt
Ebbells vei 10, N 7005 Trondheim, Norway.

Athina Stegou-Sagia

School of Mechanical Engineering, Department of
Thermal Engineering, National Technical
University of Athens, 9 Iroon Polytechniou Str.
Zografou 157 80, Athens, Greece.

Peter Stigson

School of Sustainable Development of Society and
Technology, Mälardalen University, 721 23
Västerås, Sweden.

Anna Stoppato

Department of Mechanical Engineering, University
of Padova, via Venezia, 1-35131 Padova, Italy.

Michael Stoukides

Department of Chemical Engineering, Aristotle
University of Thessaloniki, Thessaloniki 54124,
Greece.

Jian-Feng Sun

College of Food Science and Technology,
Agricultural University of Hebei, Baoding City,
Hebei Province, 071000 P.R.China.

Stanislaw Szwaja

Department of Engineering Mechanics, Michigan Technological University, 1400 Townsend Drive, Houghton, MI, 49931, U.S.A.

David S-K. Ting

Mechanical, Automotive & Materials Engineering, University of Windsor, Windsor, Ontario, N9B 3P4, Canada.

G. N. Tiwari

Centre for Energy Studies, Indian Institute of Technology Delhi, Hauz Khas, New Delhi - 110 016, India.

Bor-Jang Tsai

Department of Mechanical Engineering, Chung Hua University, No. 707, Sec. 2, Wu Fu Rd., Hsinchu 300, Taiwan.

Athanasios Tsolakis

School of Mechanical Engineering, University of Birmingham, Edgbaston, Birmingham, B15 2TT, U.K.

Per Tunestal

Department of Energy Sciences, Lund University, SE-221 00 Lund, Sweden.

Aynur Ucar

Department of Mechanical Engineering, Firat University, Elazig, Turkey.

Despina Vamvuka

Department of Mineral Resources Engineering, Technical University of Crete, University Campus, Hania 73100, Crete, Greece.

Virendra Kumar Vijay

Centre for Rural Development and Technology, Indian Institute of Technology Delhi, Hauz Khas, New Delhi 110016, India.

Shengwei Wang

Department of Building Services Engineering, The Hong Kong Polytechnic University, Hong Kong.

Yi-Ming Wei

Center for Energy and Environmental Policy Research (CEEP), Beijing Institute of Technology, No.5 South Zhongguancun Street, Haidian District, Beijing 100081, P.R.China.

Gwomei Wu

Chang Gung University, 259 Wen Hua 1st Road, Kweisan, Taoyuan 333, Taiwan.

Contents

Water and energy sustainable management in irrigation systems network.	833-860
<i>Kaloyan N. Kenov, Helena M. Ramos</i>	
Optimization of post combustion carbon capture process-solvent selection.	861-870
<i>Udara S. P. R. Arachchige, Muhammad Mohsin, Morten C. Melaaen</i>	
Polystyrene (PS) waste plastic conversion into aviation /kerosene category of fuel by using fractional column distillation process.	871-880
<i>Moinuddin Sarker, Mohammad Mamunor Rashid, Muhammad Sadikur Rahman, Mohammed Molla</i>	
Performance evaluation of roughened solar air heater having M-shaped as roughness geometry on the absorber plate.	881-894
<i>Manish Kumar Chauhan, Varun, Sachin Chaudhary</i>	
Performance analysis of wind turbine systems under different parameters effect.	895-904
<i>Salih Mohammed Salih, Mohammed Qasim Taha, Mohammed K. Alawsaj</i>	
Economic viability of a residential building integrated photovoltaic generator in South Africa.	905-914
<i>Sosten Ziuku, Edson L. Meyer</i>	
An experimental investigation of performance and exhaust emission of a diesel engine fuelled with Jatropha biodiesel and its blends.	915-926
<i>Nitin Shrivastava, S.N. Varma, Mukesh Pandey</i>	
Optimal placement of horizontal - and vertical - axis wind turbines in a wind farm for maximum power generation using a genetic algorithm.	927-938
<i>Xiaomin Chen, Ramesh Agarwal</i>	
Performance evaluation of a diesel engine fueled with methyl ester of pongamia oil.	939-948
<i>A. Haiter Lenin, K. Thyagarajan</i>	
Comparative study on sulphur reduction from heavy petroleum - Solvent extraction and microwave irradiation approach.	949-960
<i>Abdullahi Dyadya Mohammed, Abubakar Garba Isah, Musa Umaru, Shehu Ahmed, Yababa Nma Abdullahi</i>	
Application of ANN technique for rainfall forecasting over Iraq.	961-966
<i>Bashair Abdul Rahman Mohammed</i>	

Heat transfer and friction factor characteristics of rectangular channel solar air heater duct having protrusions as roughness element. 967-976

Maneesh Kaushal, Varun

The latest continuous monitoring instrumentation for ground-gas monitoring and risk prediction. 977-1014

A. N. Nwachukwu, A. W. Diya

NEW BOOK: CFD Applications in Energy and Environment Sectors: Volume 1.

Editors: Maher A.R. Sadiq Al-Baghdadi and Hashim R. Abdol Hamid (ISBN 13: 978-1-46623-065-1)

NEW BOOK: Engineering Applications of Computational Fluid Dynamics: Volume 1.

Editor: Maher A.R. Sadiq Al-Baghdadi (ISBN 13: 978-1-46623-106-1)

NEW BOOK: CFD Modeling in Development of Renewable Energy Applications.

Editor: Maher A.R. Sadiq Al-Baghdadi (ISBN 13: 978-1-46623-131-3)

NEW BOOK: Engineering Applications of Computational Fluid Dynamics: Volume 2.

Editor: Maher A.R. Sadiq Al-Baghdadi (ISBN 13: 978-1-47832-935-0)